Christian HASSE

Professor at Technische Universität Darmstadt (Technical University of Darmstadt)
Chair of Simulation of Reactive Thermo-Fluid Systems
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VISION As an engineer, I aim to deepen our understanding of thermofluidic phenomena through rigorous, fundamental research. My work is driven by the belief that engineering-based fundamental research is an independent and indispensable part of science, rooted in real-world relevance yet guided by systematic, model-based, data- and theory-driven approaches.
After completing my PhD, my experience in industry revealed how many established technical processes still lack a solid scientific foundation. This insight shaped my conviction that engineering research can serve as a bridge between curiosity-driven science and practical application, not as a one-way translation but as a distinct approach that draws strength from both domains.
Since returning to academia, first in 2010 at TU Freiberg and since 2017 at TU Darmstadt, I have been pursuing this vision. Together with my team, I develop advanced mathematical models and simulation methods to explore reactive flows on high-performance computing systems. We strive to generate knowledge that enables genuine innovation and contributes to addressing the major challenges of our time, such as the energy transition, by integrating theory, simulation, and experiment with practical application on equal terms.

SCIENTIFIC EXCELLENCE AND IMPACT This work has significantly advanced the fields of turbulent combustion, solid fuel conversion, multiphase flow modeling, and nanoparticle soot formation. In recognition of these achievements, I was elected **Fellow of the Combustion Institute** in 2021. In 2024, I received a prestigious **ERC Advanced Grant** for my project A-STEAM – Aluminum STEAM Combustion for Clean Energy, reflecting my continued ambition to develop fundamental insights for sustainable energy systems. In the same year, I was **elected Member of the Board of Directors of the International Combustion Institute**, representing more than 6,000 active members worldwide across 36 national sections. In 2025, I was elected **Fellow of the Royal Aeronautical Society (UK)**.

Educational Background

1997 Dipl.-Ing.	Mechanical Engineering	RWTH Aachen University and UC Davis, USA
2004 Dr.-Ing.	Mechanical Engineering	RWTH Aachen University

Academic Employment Record

08/2017 – present	Professor (W3) Technische Universität Darmstadt, Simulation of Reactive Thermo-Fluid Systems
06/2016 – 07/2017	Professor (W3) Technische Universität Bergakademie Freiberg, Numerical Thermo-Fluid Dynamics
03/2010 – 06/2016	Professor (W2) Technische Universität Bergakademie Freiberg, Numerical Thermo-Fluid Dynamics
03/2010 – 09/2015	Junior Research Group Leader for Virtual High Temperature Conversion Processes TU Bergakademie Freiberg, Germany

Industry Employment Record

10/2004 – 02/2010	Engineer in Research and Development *BMW Group Munich*
2000 – 2004	Independent Consultant for Software Development *Cummins Inc. (USA)*

Awards and fellowships

2026	Invited Topical Review "Emerging Energy Carriers" at the 41st International Symposium on Combustion
2025	Fellow of the Royal Aeronautical Society (UK)
2024	ERC Advanced Grant, Aluminum STEAM combustion for clean energy (A-STEAM)
2023, 2020	ASME Turbo Expo Best Paper Award
2023– present	PI in 7 HPC research projects with a total allocation of 254 Mcore-hours GPU *Tier-0/1 systems in Germany (GCS Large-Scale, JUPITER Early-Access Projects) and Europe (EuroHPC Extreme-Scale Access)*
2021	Fellow of The Combustion Institute for significant contributions to turbulent combustion, multi-phase flow and soot formation
2020– present	PI in 3 HPC research projects with a total allocation of 112 Mcore-hours CPU *Tier-0/1 systems in Germany (GCS Large-Scale Projects) and Europe*
2017* – present	PI in more than 70 HPC research projects totaling at 308 Mcore-hours CPU *Tier-2 systems in Germany* *note: earlier projects not listed due to the rapid development of HPC resources
2015 – present	Lecturer at von Karman Institute for Fluid Dynamics, Lecture Series Turbulent Combustion
2010 – present	PI of more than 60 research grants with a total funding volume of €30.4 million at TU Bergakademie Freiberg and TU Darmstadt *Industry and research funding agencies*
2004	Award for dissertation (Borchers Badge), RWTH Aachen University

Publications and communications

Links to list and bibliometrics:

- Researcher ID (WoS): A-3587-2011
- Google Scholar: hasse@stfs.tu-darmstadt.de
- ORCID: 0000-0001-9333-0911
- Scopus Author ID: 56379852500

- Archival publications: 310 (October 2025)
- Chapters in book: 5
- Communications at Int. Conf: >200
- Invited plenaries at Internat. Conferences: >20

Academic and Institutional Service

2024 – 2030	Elected Member of the Board of Directors of the International Combustion Institute *The International Combustion Institute represents the global scientific combustion community. It has around 6000 active members worldwide organized in 36 sections.*
2024 – present	Elected Member of the Board of Directors of Computational Engineering at TU Darmstadt
2024 – present	Hiroshi Tsuji Early Career Researcher Award selection committee
2021 – present	Member of the TU Darmstadt Scientific Council *The Scientific Council advises the president on strategic and structural matters concerning the development and orientation of the university. The Council is composed of 10 professors from across the University.*
2021 – 2023	Deputy director of the TU Darmstadt Research Field Energy and Environment (E+E) *More than 100 scientists from engineering, humanities, social and natural sciences are involved in E+E*
2021 – present	Member of the Scientific Advisory Board of the Barcelona Supercomputing Centre
2021 – present	Speaker Profile Topic (Profilthema) Carbon-Neutral Circles with *20 scientists of TU Darmstadt. Highly recognized scientists and major projects are combined and strategically developed in a Profile Topic.*
2021 – 2025	Co-Speaker *Cluster* ***Clean Circles*** *- Iron as an energy carrier for a climate-neutral recycling economy - with more than 25 PIs*
2019 – present	Resource Allocation Board *NHR4CES – National High Performance Computing Center for Computational Engineering Science, RWTH Aachen University and TU Darmstadt*
2019 – 2025	Scientific director (since 2021 deputy director) *Graduate School Energy Science and Engineering*
2019 – 2021	Scientific Member *High Performance Computing (HPC) Council TU Darmstadt*
2015 – present	Lecturer at von Karman Institute for Fluid Dynamics (Belgium) *Lecture Series Turbulent Combustion (biannually)*

Supervision of Doctoral Candidates and mentoring of Postdocs

2010 – present	33 PhD Graduates (defended), currently supervising 34 doctoral candidates
2025	Mentoring 4 postdocs – previously mentored 18 postdocs

Scientific Editorial Service

2024	Guest Editor Special Issue Metal-enabled Cycle of Renewable Energy in *Fuel*
2023	Colloquium chair Initial Review Committee (IRC) *CI's 40th International Symposium*
2023	Guest Editor *Applied Energy*
2021 – 2023	Guest Editor *Int. Journal of Heat and Fluid Flow*
2019 – 2020	Colloquium co-chair *38th International Symposium on Combustion*
2018 – present	Member of Editorial Board *International Journal of Engine Research*
2020 – present	Member of Editorial Board *Applications in Energy and Combustion Science*
2020 – 2031	Associate Editor *Proceedings of the Combustion Institute*
2012	Guest Editor *Flow, Turbulence and Combustion*

Organization of Workshops and Conferences

2023 – present	Co-organizer *Conference on Metal-Enabled Cycle of Renewable Energy (MECRE)*
2019 – present	Co-organizer *Two-Day Meeting on Propulsion Simulations Using OpenFOAM Technology*
2018 – present	Member of the organization committee *International Workshop on Measurement and Computation of Turbulent Flames (TNF)*
2015 – present	Co-organizer *CSC –Workshop on Clean Solids Conversion, formerly known as CBC – Workshop on Measurement and Simulation of Coal and Biomass Conversion*
2011	Co-Organizer ER*COFTAC Conference on Simulation of Multiphase Flows in Gasification and Combustion*

Contributions to Early Career Researchers and training of excellent researchers

It's one of the privileges of my profession to work alongside a diverse group of early-career researchers, to support their development – and to learn from their fresh perspectives. I aim to foster this spirit not only in everyday collaboration, but also through dedicated initiatives like the STFS Spirit (→ LINK) and programs such as Ignite Sustainability (→ LINK).

I actively support early career researchers by entrusting them with substantial responsibilities, thereby fostering their career development and visibility within the broader research community. For example, Franziska Hunger and Arne Scholtissek received the biennial Jürgen Warnatz Prize of the German Section of the Combustion Institute in 2017 and 2021, respectively, while Matthias Steinhausen was awarded the Da Vinci Award of the European Research Community on Flow, Turbulence, and Combustion (ERCOFTAC) in 2024. Through my mentorship and nomination, Wang Han (2018) and Xu Wen (2020) received the prestigious Bernard Lewis Fellowship of the International Combustion Institute.

Arne Scholtissek (appointed in 2021) and Federica Ferraro (appointed in 2023) became Athene Young Investigators at TU Darmstadt, obtaining professorial privileges. Both have successfully acquired independent grants, for example from the German Research Foundation (DFG). Arne Scholtissek, while a group leader in my institute at TU Darmstadt, received an ERC Starting Grant in 2025.

Furthermore, six of my former postdoctoral researchers have been appointed to professorial positions:

- Wang Han: Lecturer (University of Edinburgh, 2020), now Full Professor (2022, Beihang University).
- Federica Ferraro: Tenure-track Assistant Professor (2023, TU Braunschweig).
- Paulo Debiagi: Assistant Professor (2023, University of Nottingham - China Beacons Institute).
- Xu Wen: Tenured Adjunct Professor (2023, University of Science and Technology of China).
- Sandra Hartl: Professor (2024, Esslingen University).
- Hendrik Nicolai: Assistant Professor (2026, McGill University)